ASPEN MANAGEMENT GUIDELINES FOR DICKINSON AND IRON COUNTIES

Bob Doepker, Lee Evison, Doug Wagner, Dan Wilcox December 11, 2002

Aspen as a species and as a forest type, is important to the economic, biological and social welfare of the residents and visitors of Dickinson and Iron Counties.. Aspen represented 4,800 acres, or 1.6% of the pre-settlement vegetation of Dickinson and Iron Counties, based on General Land Survey data generated from information collected by early land surveyors. Most of the aspen type originated following the removal of pine, hemlock and northern hardwoods followed by repeated fires burned through the logging slash. Fire control in the 20's and 30's allowed revegetation of the land, primarily by aspen. The land was so open that large cattle and sheep ranches were established and the area advertised and sold as a potential livestock raising mecca. Triangle Ranch and Shelly Ranch are examples of livestock enterprises established during this era. Sharptailed grouse and other prairie and openland associated wildlife species were abundant during this period.

Forest Inventory and Analysis surveys conducted in Iron and Dickinson Counties reported combined totals of 342,900, 345,600, 284,000 and 273,400 acres of aspen, for the 1955, 1966, 1980 and 1993 survey years, respectively. This represents a decline of 20 % from 1955 to 1993 periods. Beginning in the 1960's, some of this abundant aspen resource was beginning to be utilized by the pulpwood industry. From 1988 to 2002

aspen increased 4.7% on state forest land in Dickinson and Iron Counties, increasing from 117,000 to 124,000 acres. Comparing 2002 aspen acres on state land, to 1993 FIA information, aspen on state forest lands represents 45% of the total aspen acreage in the two counties. Initially, the paper mill in Niagara was the main consumer of aspen.

In 1963, the total area of aspen identified in Dickinson and Iron Counties on the Copper Country State Forest (CCSF) was 127,817 acres or 43 percent of the total state forest area of 296,662 acres. Allowable cuts were established on state forest lands, but markets were not suitable to cut this amount of timber and allowable cuts fell short of the desired goal.

The allowable cut for the forests in Dickinson and Iron Counties in the period of 1976-1985 were established at approximately 3100 acres. The 1976 -1986 Management Plan for the Ford River State Forest in Dickinson County stated, "with a projected 40 year rotation, approximately 1500 acres of aspen type is to be cut annually." In addition, depending upon the equipment used for harvesting, post-sale treatment may be required on 800 to 1200 acres to remove residual trees to maximize aspen regeneration. Follow-up treatment may include Wildlife Division's K-G blade, manual cutting provided from Wildlife Division, Forest Cultivation Funds or prescribed burning.

During this era, aspen was emphasized as a key component of the Deer Range

Improvement Program (DRIP) and also important to other wildlife species including

ruffed grouse and woodcock. The DRIP program was initiated in the 1970's. One dollar

and fifty cents from each hunting license sold was dedicated to improving the range for

deer. The Ford River Management Plan stated, "The natural process of plant succession would adversely affect deer during the next 10 years if left unchecked," and also, "Most upland work done for deer will have side benefits for grouse." One of the goals set at that time was that "not less than 60 percent of the upland area of each compartment should be occupied by a combination of aspen, oak, jack pine, grass openings, and upland brush. Aspen should not be less that 35 percent of the total upland area."

Initially, there was considerable opposition among the loggers to the management prescription of clearcutting all trees >2" dbh within the harvest area to encourage aspen. Loggers would have preferred to cut the large trees, leaving the smaller trees to harvest in 10 or 20 years. This cutting practice created many of the two-aged stands that are in evidence today.

Most loggers were not equipped to implement the prescription of cutting all trees > 2" dbh, when aspen was the management objective. Typical equipment in the early 70's was a chainsaw, Iron Mule, and a small truck that could haul five to ten cords at a time. Aspen markets in the early 70's were found primarily in Wisconsin, mainly Niagara and the Fox River Valley. As markets expanded, loggers became more mechanized to meet increased demand for aspen. Timber sales offered at that time were 100 to 500 acres in size. Slashers, grapple skidders, and large capacity logging trucks were required to produce and transport products to the mill. When new mills were constructed in the 1980's, markets for hardwood and other species developed and their utilization was no longer a problem.

The majority of the timber harvesting in the Crystal Falls Management Unit occurred during the mid 1970s 's through the 1990's. Currently 40% of the aspen on the forest is \leq 20 years of age, 62% is < 30 and 73% is 40 years or younger.

Unit-wide, the 11 to 20-year-old and the 21 to 30-year-old age classes are the largest. Previously, harvest figures were based on creating only four age classes. The committee tasked with developing sustainable aspen harvest guidelines, recommends, establishing nine age classes, with four harvest age classes of 45 (40-49 years), 55, 65 and 75 years for 90% of the aspen cover type. The remaining 10 percent of the aspen resource will be encouraged to convert to conifers, as prescribed in the Western Upper Peninsula Interim Guidelines for State Forest Lands, or will be left because of inaccessibility, influence zones, BMP considerations, or Old Growth.

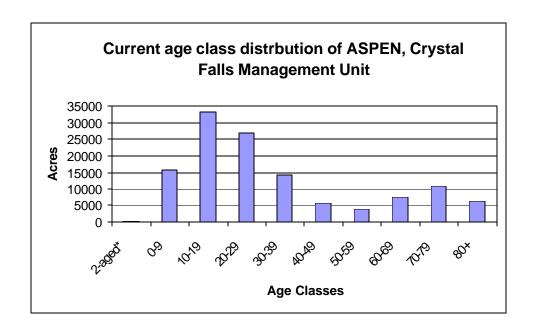
In areas where the harvest of the aspen type led to the elimination of, or decline in quality of the mixed conifer transition zone that allowed deer to move from the lowland conifer thermal cover to the upland browse, efforts should be made to restore the transition zone. This will be a long term management objective, in many cases where the conifer is just beginning to reoccupy the transition zone 10-15 years after harvest. Restoration of this important component of winter deer range will only occur if future timber sale boundaries are moved from the lowland conifer edge to the transition zone, aspen type edge. This will also allow a small percentage of the older age aspen trees to remain as a component of the transition zone, providing a food source for wildlife species that use older aspen for potential nesting cavities and feeding sites.

Demand for the aspen resource is not diminishing. Pulpwood, OSB, and logs are in demand and USFS surveys suggest this demand will continue. Deer and grouse hunting also continue to be important in the area. Hunter numbers increased from 1991 -1996 in Michigan, but regionally, public land open to deer and grouse hunting has diminished. This may result in increased hunter numbers on public land, as they search for opportunities to hunt deer and grouse from an ever-widening area.

ASPEN MODEL

The Forest Simulation Optimization Model (FORSOM) developed by Dr. Larry Leefers, Michigan State University, was used to determine the desired age class distribution for the aspen resource on state land in the Crystal Falls Management Unit in Iron and Dickinson Counties.FORSOM is a computer spreadsheet model, which simulates the effects of various harvest dregeneration and successional patterns and relationships. The model utilizes Operations Inventory data, taking into account the beginning inventory, rotation ages, desired age class distributions, even-flow considerations, and forest successions into and out of different cover types. FORSOM was used in the development of a ten-year timber plan for aspen and expected distribution out to fifty years if conditions were not altered.

<u>Current aspen age-class distribution —</u> <u>Figure 1.</u>



Current Aspen age-class distribution in acres —

| 2-aged | 0-9 | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | Total |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|------|--------|
| 257 | 15836 | 33104 | 27011 | 14499 | 5682 | 3807 | 7560 | 10780 | 6325 | 124861 |

Forest succession assumptions made in the FORSOM model —

Several natural and directed successional assumptions were made in the FORSOM optimization model as shown in the following table. Succession into the aspen type was not considered as it was the opinion of the committee that this type conversion would not be common, at least in the next 10 years, having occurred during the last thirty years, or so. Seven percent conversion to spruce-fir is a goal for an increase in mesic conifers in 2000.

Percentage assumptions for directed conversion from aspen to other types —

| Percent of Aspen converted to grass in decades 1-5. | 1% |
|--|----|
| Percent of Aspen converted to upland brush in decades 1-5. | 0% |
| Percent of Aspen converted to red pine in decades 1-5. | 2% |
| Percent of Aspen converted to spruce-fir in decades 1-5. | 7% |
| Percent of Aspen converted to jack pine in decades 1-5. | 0% |
| Percent of Aspen converted to n. hardwoods in decades 1-5. | 1% |
| Percent of Aspen converted to white pine in decades 1-5. | 1% |

Natural succession for unharvested stands following 80-89 age class

The percentages of natural succession listed in the table below are best estimates of aspen converting to other types because of potential old growth designations, influence zone withdrawals from harvest, and inaccessible areas.

| Percent converted to spruce-fir at age 20–29 | 48% |
|--|-----|
| Percent converted to white pine at age 20–29 | 12% |
| Percent converted to n. hardwoods at age 30–39 | 39% |
| Percent converted to oak at age 30–39 | 1% |

Acres available for harvest —

Of 123, 283 total acres of aspen, slightly over 15,000 acres were considered unavailable for harvest due to a future estimate of potential old growth, influence zones, visual

management considerations, and inaccessible areas. Thus, about 108,200 acres were considered available for harvest and were modeled with results shown out to five decades.

FORSOM results. Acres available for harvest per decade.

| Estimated Harvest Acres Per Decade | | | | | | | | | |
|------------------------------------|--------|--------|--------|--------|--------|---------|----------------------|--|--|
| Acres Harveste | 1 | 2 | 3 | 4 | 5 | Average | Standard Deviatio | | |
| d | | | | | | | n | | |
| u | 15,727 | 15,560 | 15,864 | 15,500 | 15,199 | 15,570 | 252 | | |

| Estimated | Harvest by . | Age Class p | er Decade | | |
|-----------|--------------|-------------|-----------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 |
| Age Class | | | | | |
| | | | | | |
| 2-aged | | | | | |
| 0-9 | | | | | |
| 10-19 | | | | | |
| 20-29 | | | | | |
| 30-39 | | | | | |
| 40-49 | 182 | 5,500 | 9,500 | 7,000 | 1,000 |
| 50-59 | 1,200 | 4,000 | 5,000 | 6,500 | 9,000 |
| 60-69 | 3,500 | 2,000 | 1,000 | 2,000 | 4,500 |
| 70-79 | 9,280 | 3,360 | 307 | | 699 |
| 80-89 | 1,565 | 500 | | | |
| | | | | | |
| Total | 15,727 | 15,560 | 15,864 | 15,500 | 15,199 |

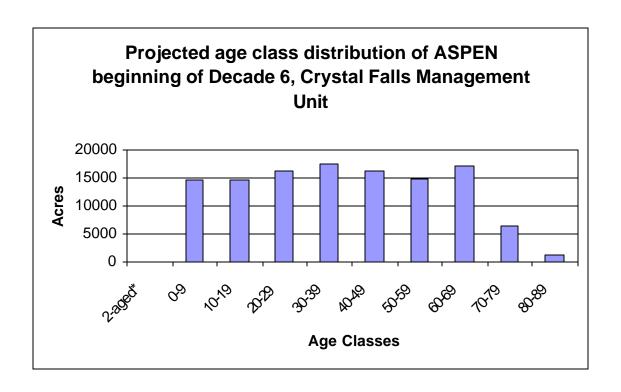
Approximately 1,550 acres per year, or 15,500 for each 10-year period, is estimated to be available for harvest, based on the model results. However, harvests may be constrained or expanded beyond what was modeled because of unanticipated redirection from eventual ecosystem planning efforts. The harvest level is an average and will probably range from 1,530 acres per year to 1,580 acres, depending upon the variation of aspen acres available each entry year, as shown in the table below.

| | Variation in Acres of Aspen by Entry Year | | | | | | | | | | | |
|--|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|-----------------------|
| Year of Entry | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Average | Standard Deviation |
| ASPEN greater than 40 years old | 3,003 | 4,694 | 3,604 | 2,890 | 4,490 | 3,134 | 2,975 | 2,069 | 4,876 | 2,676 | 3,441 | 896 |
| Total acres of ASPEN in the entry year | 11,097 | 15,100 | 13,375 | 12,733 | 12,231 | 11,014 | 10,714 | 11,358 | 14,911 | 12,328 | 12,486 | 1,489 |

The table below depicts the estimated total acres for the beginning of each of 6 decades, beginning with current total acres of 124,861, and assuming a harvest of about 15,500 acres per decade. As can be seen, the trend for the total amount of aspen decreases slightly over fifty, mainly because of aspen type conversions following harvest and natural succession after reaching an assumed age of 90 years.

| Sı | Summary Results Table - ASPEN Acres at Beginning of Each Decade | | | | | | | | | |
|---------|---|---------|---------|---------|---------|---------|--|--|--|--|
| | Decade | | | | | | | | | |
| Timber | | | | | | | | | | |
| Age | 1 | 2 | 3 | 4 | 5 | 6 | | | | |
| Classes | | | | | | | | | | |
| 2-aged | 257 | 257 | 57 | 0 | 0 | 0 | | | | |
| 0-9 | 15,836 | 16,329 | 17,535 | 16,235 | 14,588 | 14,526 | | | | |
| 10-19 | 33,104 | 15,836 | 16,329 | 17,535 | 16,235 | 14,588 | | | | |
| 20-29 | 27,011 | 33,104 | 15,836 | 16,329 | 17,535 | 16,235 | | | | |
| 30-39 | 14,499 | 27,011 | 33,104 | 15,836 | 16,329 | 17,535 | | | | |
| 40-49 | 5,682 | 14,499 | 27,011 | 33,104 | 15,836 | 16,329 | | | | |
| 50-59 | 3,807 | 5,500 | 8,999 | 17,511 | 26,104 | 14,836 | | | | |
| 60-69 | 7,560 | 2,607 | 1,500 | 3,999 | 11,011 | 17,104 | | | | |
| 70-79 | 10,780 | 4,060 | 607 | 500 | 1,999 | 6,511 | | | | |
| 80 + | 6,325 | 1,500 | 700 | 300 | 500 | 1,300 | | | | |
| Total | 124,861 | 120,703 | 121,678 | 121,349 | 120,137 | 118,964 | | | | |

The figures above for the beginning of the sixth decade are depicted in the following projected age class distribution chart.



Part 3

The literature pertaining to aspen regeneration indicates clear-cutting all trees >2 in dbh and exposing the root system to full sunlight maximizes vegetative reproduction. Leaving as little as ten square feet of basal area of red maple can reduce the final stocking of the next stand of aspen by thirty percent (Perela). Future stocking may be sacrificed for some species that are valuable visually, ecologically and economically. Examples of trees often left in aspen clear-cuts are pines, oaks, cherry, cedar, and ash. Generally, all aspen, white birch, and maple with a DBH of two inches or more are cut. Spruce and balsam with a DBH of four inches or less are generally left. The results from leaving the aforementioned species do not appreciably affect future stocking.

Aspen should not be cut in early summer if regeneration is a concern. This is especially true in lower site index stands or stands on poorer soil types.

During the last four decades four age classes were thought to be adequate, even though it was never realized. A rule of thumb of cutting one half of the available mature aspen each decade was used on some Forest Management Units (FMUs), to more equitably distribute the aspen harvest, while other FMUs attempted to harvest all available aspen. This has resulted in maintenance of aspen acres, but in a skewed age class distribution (Figure 1). Maintaining the aspen forest type provides the opportunity to create structure and spatial distribution in the regenerating aspen stands. Now, we have an opportunity to enter four age classes each entry year and begin harvesting aspen while considering values on a forest wide basis. Spatially, establishment of these smaller stands within the larger areas can be planned to optimize ecological values. Care should be taken to also consider such factors as site index, soils, aspect, slope, visual management, and natural features existing within the large stands. An opportunity exists to be creative in stand layout and design due to advances in GPS technology and support. We can create stands that more closely mimic natural processes or ecological succession. A study of natural disturbances and patterns would be a helpful tool to ensure that structure and spatial distributions were achieved. Guidelines should be developed that insure the aspen resource will be maintained at the desired level or percentage on the forest area, without sacrificing other ecological values. A long term sustainable harvest of the aspen type should allow for a constant flow of wood products, ecological integrity of the ecosystem and recreational activities associated with all age classes of aspen. An even age class distribution of the aspen type will help meet the needs of all game and nongame species associated with the type, and will help even out the "boom and bust" situation we sometimes find ourselves facing with our present uneven age class distribution.

Appendix 1. Estimated change in wildlife species, based on change in forest cover types, from circa 1800 to 2002 OI, CCFMU.

| Name | Crystal Falls_GLO | | Gain/Loss | Percent |
|--|-------------------|----------------|------------------|----------------|
| Magnolia Warbler | 116872 | 7168 | | -93.9 |
| Blue-Headed Vireo | 117250 | 11451 | -105799 | -90.2 |
| White-Winged Crossbill | 122380 | 13308 | -109072 | -89.1 |
| Northern Parula | 124526 | 18701 | -105825 | -85.0 |
| Black-Throated Green Warbler | 136207 | 21243 | -114964 | -84.4 |
| Yellow-Rumped Warbler | 136207 | 22083 | -114124 | -83.8 |
| Blackburnian Warbler | 136533 | 24224 | -112309 | -82.3 |
| Hermit Thrush | 136533 | 24224 | -112309 | -82.3 |
| Mourning Dove | 136533 | 34682 | -101851 | -74.6 |
| Redback Salamander | 192787 | 50634 | -142153 | -73.7 |
| Red-Breasted Nuthatch | 196614 | 59077 | -137537 | -70.0 |
| Winter Wren | 198760 | 64470 | -134290 | -67.6 |
| Purple Finch | 197514 | 64542 | -132972 | -67.3 |
| American Marten | 199086 | 68291 | -130795 | -65.7 |
| Black-Backed Woodpecker | 203127 | 70348 | -132779 | -65.4 |
| Northern Saw-Whet Owl | 222305 | 81775 | -140530 | -63.2 |
| Golden-Crowned Kinglet | 218421 | 81526 | -136895 | -62.7 |
| Northern Flying Squirrel | 273377 | 105866 | | -61.3 |
| White-Throated Sparrow | 203188 | 80117 | -123071 | -60.6 |
| Merlin | 216087 | 86669 | -129418 | -59.9 |
| Fisher | 201124 | 82000 | -119124 | -59.2 |
| Spring Peeper | 281726 | 133772 | | -52.5 |
| Wood Frog | 281726 | 133772 | | -52.5 |
| Gray Treefrog | 281726 | 133772 | -147954 | -52.5 |
| Canada Warbler | 75915 | 43466 | -32449 | -42.7 |
| Black-Throated Blue Warbler Spotted Salamander | 75915 75915 | 43466 43466 | -32449 -32449 | -42.7 -42.7 |
| Ringneck Snake | 75915 75915 | 43466 | -32449 | -42.7 -42.7 |
| Red-Headed Woodpecker | 75915 75915 | 44859 | -31056 | -42.7 -40.9 |
| Great Crested Flycatcher | 76210 | 45710 | -30500 | -40.0 |
| Red-Bellied Woodpecker | 76210 | 45710 | -30500 | -40.0 |
| Four-Toed Salamander | 76072 | 46114 | -29958 | -39.4 |
| Eastern Phoebe | 76210 | 47465 | -28745 | -37.7 |
| Blue-Spotted Salamander | 76210 | 47465 | -28745 | -37.7 |
| Common Goldeneye | 79397 | 49899 | -29498 | -37.2 |
| Osprey | 79397 | 49899 | -29498 | -37.2 |
| Hooded Merganser | 78413 | 50017 | -28396 | |
| Double-Crested Cormorant | 79692 | 52143 | -27549 | -34.6 |
| Swainson's Thrush | 85772 | 57551 | -28221 | -32.9 |
| Ruby-Throated Hummingbird | 154328 | 104221 | -50107 | -32.5 |
| Common Merganser | 79692 | 53898 | -25794 | -32.4 |
| Least Chipmunk | 86296 | 62227 | -24069 | -27.9 |
| Boreal Chickadee | 85774 | 61885 | -23889 | -27.9 |
| Pine Warbler | 19335 | 14075 | -5260 | -27.2 |
| Ruby-Crowned Kinglet | 91635 | 67194 | -24441 | -26.7 |
| Pine Grosbeak | 87594 | 64297 | -23297 | -26.6 |

| Pine Siskin | 91804 | 67527 | -24277 | -26.4 |
|-----------------------------|--------|--------|--------|-------|
| Gray Jay | 87920 | 67278 | -20642 | -23.5 |
| Common Porcupine | 297519 | 242814 | -54705 | -18.4 |
| Moose | 276991 | 227282 | -49709 | -18.0 |
| Bald Eagle | 290915 | 239754 | -51161 | -17.6 |
| Black-Capped Chickadee | 303322 | 257382 | -45940 | -15.2 |
| Brown Creeper | 303322 | 257382 | -45940 | -15.2 |
| Northern Waterthrush | 88136 | 75921 | -12215 | -13.9 |
| Eastern Newt | 304952 | 262673 | -42279 | -13.9 |
| White-Tailed Deer | 272530 | 239053 | -33477 | -12.3 |
| Arctic Shrew | 88293 | 77729 | -10564 | -12.0 |
| Black Bear | 303322 | 268120 | -35202 | -11.6 |
| Red Fox | 303322 | 268120 | -35202 | -11.6 |
| Northern Short-Tailed Shrew | 303322 | 268120 | -35202 | -11.6 |
| Hoary Bat | 303322 | 268120 | -35202 | -11.6 |
| Red Squirrel | 219458 | 194508 | -24950 | -11.4 |
| Deer Mouse | 303322 | 268960 | -34362 | -11.3 |
| Northern Myotis | 304601 | 272001 | -32600 | -10.7 |
| Little Brown Myotis | 304601 | 272001 | -32600 | -10.7 |
| Bobcat | 301507 | 270944 | -30563 | -10.1 |
| Mourning Warbler | 305686 | 275192 | -30494 | -10.0 |
| Northern Goshawk | 217255 | 195832 | -21423 | -9.9 |
| Sharp-Shinned Hawk | 217255 | 195832 | -21423 | -9.9 |
| Nashville Warbler | 305686 | 275752 | -29934 | -9.8 |
| White-Footed Mouse | 217255 | 196112 | -21143 | -9.7 |
| Long-Tailed Weasel | 305686 | 276032 | -29654 | -9.7 |
| Ermine | 305686 | 276032 | -29654 | -9.7 |
| American Black Duck | 82564 | 74646 | -7918 | -9.6 |
| Masked Shrew | 305843 | 277560 | -28283 | -9.3 |
| Southern Red-Backed Vole | 305843 | 277840 | -28003 | -9.2 |
| Barred Owl | 192561 | 176187 | -16374 | -8.5 |
| Star-Nosed Mole | 88588 | 81728 | -6860 | -7.7 |
| Water Shrew | 89923 | 83020 | -6903 | -7.7 |
| Common Raccoon | 299662 | 279408 | -20254 | -6.8 |
| Pygmy Shrew | 286560 | 268501 | -18059 | -6.3 |
| Common Raven | 305843 | 288298 | -17545 | -5.7 |
| Coyote | 305843 | 288298 | -17545 | -5.7 |
| Gray Wolf | 276173 | 262219 | -13954 | -5.1 |
| Northern Flicker | 217255 | 206570 | -10685 | -4.9 |
| American Crow | 217255 | 206570 | -10685 | -4.9 |
| Eastern Cottontail | 217255 | 206570 | -10685 | -4.9 |
| Striped Skunk | 217255 | 206570 | -10685 | -4.9 |
| Brown-Headed Cowbird | 217255 | 206570 | -10685 | -4.9 |
| Great Horned Owl | 217550 | 210569 | -6981 | -3.2 |
| American Toad | 217901 | 211979 | -5922 | -2.7 |
| Western Meadowlark | 0 | 0 | 0 | 0.0 |
| Grasshopper Sparrow | 0 | 0 | 0 | 0.0 |
| Savannah Sparrow | 0 | 0 | 0 | 0.0 |
| Sedge Wren | 0 | 0 | 0 | 0.0 |

| Snow Bunting | 0 | 0 | 0 | 0.0 |
|--------------------------------|--------|--------|--------|-------|
| Bobolink | 0 | 0 | 0 | 0.0 |
| Eastern Meadowlark | 0 | 0 | 0 | 0.0 |
| Thirteen-Lined Ground Squirrel | 0 | 0 | 0 | 0.0 |
| American Badger | 0 | 0 | 0 | 0.0 |
| House Finch | 0 | 0 | 0 | 0.0 |
| Evening Grosbeak | 0 | 0 | 0 | 0.0 |
| American Kestrel | 0 | 0 | 0 | 0.0 |
| Upland Sandpiper | 0 | 0 | 0 | 0.0 |
| Chimney Swift | 0 | 0 | 0 | 0.0 |
| Horned Lark | 0 | 0 | 0 | 0.0 |
| Vesper Sparrow | 0 | 0 | 0 | 0.0 |
| Common Garter Snake | 220422 | 231317 | 10895 | 4.9 |
| Red Crossbill | 26991 | 29942 | 2951 | 10.9 |
| Redbelly Snake | 135791 | 154041 | 18250 | 13.4 |
| Bay-Breasted Warbler | 5706 | 6995 | 1289 | 22.6 |
| Black-And-White Warbler | 158840 | 217626 | 58786 | 37.0 |
| Hairy Woodpecker | 159135 | 221625 | 62490 | 39.3 |
| Chestnut-Sided Warbler | 159135 | 221905 | 62770 | 39.4 |
| Silver-Haired Bat | 166789 | 233158 | 66369 | 39.8 |
| Southern Bog Lemming | 172652 | 246515 | 73863 | 42.8 |
| Spruce Grouse | 11697 | 17924 | 6227 | 53.2 |
| Dark-Eyed Junco | 6032 | 10256 | 4224 | 70.0 |
| Cape May Warbler | 7330 | 12886 | 5556 | 75.8 |
| Blue Jay | 100383 | 188664 | 88281 | 87.9 |
| Snowshoe Hare | 118310 | 226721 | 108411 | 91.6 |
| Woodland Jumping Mouse | 86723 | 175578 | 88855 | 102.5 |
| Cerulean Warbler | 80722 | 166339 | 85617 | 106.1 |
| Five-Lined Skink | 80722 | 166339 | 85617 | 106.1 |
| White-Breasted Nuthatch | 80722 | 167732 | 87010 | 107.8 |
| Eastern Gray Squirrel | 80722 | 167732 | 87010 | 107.8 |
| Eastern Fox Squirrel | 80722 | 167732 | 87010 | 107.8 |
| Rose-Breasted Grosbeak | 80722 | 167732 | 87010 | 107.8 |
| Red-Eyed Vireo | 80722 | 167732 | 87010 | 107.8 |
| Scarlet Tanager | 80722 | 167732 | 87010 | 107.8 |
| Eastern Wood-Pewee | 80722 | 167732 | 87010 | 107.8 |
| Southern Flying Squirrel | 80722 | 167732 | 87010 | 107.8 |
| Pileated Woodpecker | 81017 | 168583 | 87566 | 108.1 |
| Eastern Chipmunk | 80722 | 168012 | 87290 | 108.1 |
| Baltimore Oriole | 81017 | 169976 | 88959 | 109.8 |
| Blue-Gray Gnatcatcher | 81017 | 169976 | 88959 | 109.8 |
| Wood Thrush | 81017 | 169976 | 88959 | 109.8 |
| Veery | 81017 | 170338 | 89321 | 110.3 |
| Red-Shouldered Hawk | 81017 | 170338 | 89321 | 110.3 |
| Ovenbird | 80722 | 171608 | 90886 | 112.6 |
| Least Flycatcher | 80722 | 171608 | 90886 | 112.6 |
| Yellow-Bellied Sapsucker | 80722 | 171608 | 90886 | 112.6 |
| Brown Thrasher | 80722 | 171888 | 91166 | 112.9 |
| Red-Tailed Hawk | 81048 | 174589 | 93541 | 115.4 |

| D W I I | 04047 | 475007 | 0.4500 | 440.0 |
|-------------------------------|-------|--------|--------|-------|
| Downy Woodpecker | 81017 | 175607 | 94590 | 116.8 |
| Indigo Bunting | 81017 | 175887 | 94870 | 117.1 |
| Warbling Vireo | 81017 | 175887 | 94870 | 117.1 |
| Common Gray Fox | 81017 | 180714 | 99697 | 123.1 |
| Broad-Winged Hawk | 80722 | 182346 | 101624 | 125.9 |
| Whip-Poor-Will | 80722 | 182346 | 101624 | 125.9 |
| Ruffed Grouse | 83086 | 189138 | 106052 | 127.6 |
| Yellow-Billed Cuckoo | 83086 | 189418 | 106332 | 128.0 |
| Northern Cardinal | 83381 | 191662 | 108281 | 129.9 |
| American Robin | 81017 | 186345 | 105328 | 130.0 |
| Cooper's Hawk | 81017 | 186345 | 105328 | 130.0 |
| Eastern Red Bat | 81017 | 186345 | 105328 | 130.0 |
| Cedar Waxwing | 81017 | 186345 | 105328 | 130.0 |
| Gray Catbird | 83381 | 193417 | 110036 | 132.0 |
| American Redstart | 83381 | 193417 | 110036 | 132.0 |
| American Woodcock | 83086 | 199876 | 116790 | 140.6 |
| Olive -Sided Flycatcher | 13904 | 33646 | 19742 | 142.0 |
| Virginia Opossum | 83381 | 203875 | 120494 | 144.5 |
| Belted Kingfisher | 1279 | 3881 | 2602 | 203.4 |
| Northern Rough-Winged Swallow | 1279 | 3881 | 2602 | 203.4 |
| Killdeer | 1279 | 3881 | 2602 | 203.4 |
| Purple Martin | 1279 | 3881 | 2602 | 203.4 |
| Common Loon | 1279 | 3881 | 2602 | 203.4 |
| Cliff Swallow | 1279 | 3881 | 2602 | 203.4 |
| Bank Swallow | 1279 | 3881 | 2602 | 203.4 |
| Spotted Sandpiper | 1279 | 3881 | 2602 | 203.4 |
| Northern River Otter | 1279 | 3881 | 2602 | 203.4 |
| Ring-Billed Gull | 1279 | 3881 | 2602 | 203.4 |
| Herring Gull | 1279 | 3881 | 2602 | 203.4 |
| Mudpuppy | 1279 | 3881 | 2602 | 203.4 |
| Black Tern | 1630 | 5291 | 3661 | 224.6 |
| Green Frog | 1630 | 5291 | 3661 | 224.6 |
| Bullfrog | 1630 | 5291 | 3661 | 224.6 |
| Northern Leopard Frog | 1630 | 5291 | 3661 | 224.6 |
| Pied-Billed Grebe | 1630 | 5291 | 3661 | 224.6 |
| Snapping Turtle | 1630 | 5291 | 3661 | 224.6 |
| Muskrat | 1630 | 5291 | 3661 | 224.6 |
| Ruddy Duck | 1630 | 5291 | 3661 | 224.6 |
| Virginia Rail | 1630 | 5291 | 3661 | 224.6 |
| Yellow-Headed Blackbird | 1630 | 5291 | 3661 | 224.6 |
| Mink Frog | 1436 | 5689 | 4253 | 296.2 |
| Pickerel Frog | 1787 | 7099 | 5312 | 297.3 |
| Sora | 1787 | 7099 | 5312 | 297.3 |
| Ring-Necked Duck | 1787 | 7099 | 5312 | 297.3 |
| American Coot | 1787 | 7099 | 5312 | 297.3 |
| Painted Turtle | 1787 | 7099 | 5312 | 297.3 |
| Rough-Legged Hawk | 351 | 1410 | 1059 | 301.7 |
| Northern Pintail | 351 | 1410 | 1059 | 301.7 |
| Marsh Wren | 351 | 1410 | 1059 | 301.7 |
| | | | | |

| Meadow Jumping Mouse | 8070 | 35263 | 27193 | 337.0 |
|-----------------------|-------|--------|--------|---------|
| Great Blue Heron | 1925 | 9290 | 7365 | 382.6 |
| Blanding's Turtle | 3994 | 22821 | 18827 | 471.4 |
| Mink | 3994 | 22821 | 18827 | 471.4 |
| Red-Winged Blackbird | 3994 | 22821 | 18827 | 471.4 |
| Wood Duck | 4289 | 26820 | 22531 | 525.3 |
| Green Heron | 4289 | 26820 | 22531 | 525.3 |
| Chipping Sparrow | 24090 | 151653 | 127563 | 529.5 |
| Common Yellowthroat | 2715 | 18940 | 16225 | 597.6 |
| Green-Winged Teal | 2715 | 19220 | 16505 | 607.9 |
| Swamp Sparrow | 2872 | 20748 | 17876 | 622.4 |
| American Bittern | 2872 | 20748 | 17876 | 622.4 |
| Wood Turtle | 2364 | 17530 | 15166 | 641.5 |
| Eastern Kingbird | 2364 | 17530 | 15166 | 641.5 |
| Alder Flycatcher | 2364 | 17530 | 15166 | 641.5 |
| Common Grackle | 2872 | 21588 | 18716 | 651.7 |
| Common Snipe | 2872 | 21588 | 18716 | 651.7 |
| House Wren | 2364 | 17810 | 15446 | 653.4 |
| Black-Billed Cuckoo | 2364 | 17810 | 15446 | 653.4 |
| Northern Bobwhite | 2364 | 17810 | 15446 | 653.4 |
| Northern Harrier | 2521 | 19338 | 16817 | 667.1 |
| Brewer's Blackbird | 508 | 4058 | 3550 | 698.8 |
| Yellow Warbler | 2659 | 21809 | 19150 | 720.2 |
| Mallard | 3994 | 33559 | 29565 | 740.2 |
| Canada Goose | 1630 | 15749 | 14119 | 866.2 |
| Tree Swallow | 1630 | 15749 | 14119 | 866.2 |
| Barn Swallow | 1630 | 15749 | 14119 | 866.2 |
| Common Nighthawk | 326 | 3261 | 2935 | 900.3 |
| American Tree Sparrow | 2715 | 29678 | 26963 | 993.1 |
| Big Brown Bat | 1279 | 14619 | 13340 | 1043.0 |
| Lincoln's Sparrow | 483 | 5629 | 5146 | 1065.4 |
| Common Redpoll | 2364 | 28268 | 25904 | 1095.8 |
| Song Sparrow | 2364 | 28268 | 25904 | 1095.8 |
| Willow Flycatcher | 2364 | 28268 | 25904 | 1095.8 |
| Eastern Towhee | 326 | 4654 | 4328 | 1327.6 |
| Wilson's Warbler | 157 | 2648 | 2491 | 1586.6 |
| Tennessee Warbler | 157 | 2648 | 2491 | 1586.6 |
| Connecticut Warbler | 157 | 2648 | 2491 | 1586.6 |
| American Beaver | 8450 | 149915 | 141465 | 1674.1 |
| Yellow-Throated Vireo | 5102 | 126510 | 121408 | 2379.6 |
| Philadelphia Vireo | 4807 | 124908 | 120101 | 2498.5 |
| Sandhill Crane | 508 | 13676 | 13168 | 2592.1 |
| Smooth Green Snake | 508 | 13956 | 13448 | 2647.2 |
| Wild Turkey | 4807 | 134724 | 129917 | 2702.7 |
| Blue-Winged Teal | 351 | 11868 | 11517 | 3281.2 |
| Field Sparrow | 326 | 13719 | 13393 | 4108.3 |
| Clay-Colored Sparrow | 326 | 13719 | 13393 | 4108.3 |
| White-Crowned Sparrow | 0 | 280 | 280 | 28000.0 |
| Sharp-Tailed Grouse | 0 | 280 | 280 | 28000.0 |
| | | | | |

| Golden-Winged Warbler | 0 | 280 | 280 | 28000.0 |
|---------------------------|---|-------|-------|-----------|
| Yellow-Bellied Flycatcher | 0 | 840 | 840 | 84000.0 |
| Least Weasel | 0 | 10458 | 10458 | 1045800.0 |
| Eastern Bluebird | 0 | 10458 | 10458 | 1045800.0 |
| Fox Snake | 0 | 10458 | 10458 | 1045800.0 |
| Eastern Pipistrelle | 0 | 10738 | 10738 | 1073800.0 |
| Turkey Vulture | 0 | 10738 | 10738 | 1073800.0 |
| Northern Shrike | 0 | 10738 | 10738 | 1073800.0 |
| Meadow Vole | 0 | 10738 | 10738 | 1073800.0 |
| American Goldfinch | 0 | 10738 | 10738 | 1073800.0 |
| Woodchuck | 0 | 12131 | 12131 | 1213100.0 |

Appendix 2. Change in acres by forest cover type, and estimated impacts on wildlife species, using MIWILD, CFFMU 1988-2002.

Name

1988 CFFMU 2002 May CFFMU 2002 May CFFMU 2003 May CFFMU 2003 May CFFMU 2003 May CFFMU 2004 May CFFMU

| Name | 1988_CFFMU | 2002_Mar_CFFMU117312 | Gain/Loss | Percent |
|------------------------------|------------|----------------------|-----------|---------|
| Bay-Breasted Warbler | 12909 | 6995 | -5914 | -45.8 |
| Magnolia Warbler | 12996 | 7168 | -5828 | -44.8 |
| Dark-Eyed Junco | 16376 | 10256 | -6120 | -37.4 |
| Northern Mockingbird | 440 | 280 | -160 | -36.4 |
| Prairie Warbler | 440 | 280 | -160 | -36.4 |
| White-Crowned Sparrow | 440 | 280 | -160 | -36.4 |
| Golden-Winged Warbler | 440 | 280 | -160 | -36.4 |
| Sharp-Tailed Grouse | 440 | 280 | -160 | -36.4 |
| Cape May Warbler | 18982 | 12886 | -6096 | -32.1 |
| White-Winged Crossbill | 19241 | 13308 | -5933 | -30.8 |
| Blue-Headed Vireo | 16484 | 11451 | -5033 | -30.5 |
| Spruce Grouse | 24214 | 17924 | -6290 | -26.0 |
| Meadow Jumping Mouse | 43917 | 35263 | -8654 | -19.7 |
| Olive -Sided Flycatcher | 41035 | 33646 | -7389 | -18.0 |
| Northern Parula | 22137 | 18701 | -3436 | -15.5 |
| Black-Throated Green Warbler | 24983 | 21243 | -3740 | -15.0 |
| Yellow-Rumped Warbler | 25665 | 22083 | -3582 | -14.0 |
| Blackburnian Warbler | 28010 | 24224 | -3786 | -13.5 |
| Hermit Thrush | 28010 | 24224 | -3786 | -13.5 |
| Mourning Dove | 39724 | 34682 | -5042 | -12.7 |
| Red Crossbill | 33996 | 29942 | -4054 | -11.9 |
| Meadow Vole | 12154 | 10738 | -1416 | -11.7 |
| Turkey Vulture | 12154 | 10738 | -1416 | -11.7 |
| Eastern Pipistrelle | 12154 | 10738 | -1416 | -11.7 |
| Racer | 12154 | 10738 | -1416 | -11.7 |
| American Goldfinch | 12154 | 10738 | -1416 | -11.7 |
| Northern Shrike | 12154 | 10738 | -1416 | -11.7 |
| Smooth Green Snake | 15697 | 13956 | -1741 | -11.1 |
| Least Weasel | 11714 | 10458 | -1256 | -10.7 |
| Eastern Bluebird | 11714 | 10458 | -1256 | -10.7 |
| Fox Snake | 11714 | 10458 | -1256 | -10.7 |

| Sandhill Crane | 15257 | 13676 | -1581 | -10.4 |
|---------------------------|-------|-------|-------|--------------|
| Blue-Winged Teal | 13224 | 11868 | -1356 | -10.3 |
| Redback Salamander | 56079 | 50634 | -5445 | -9.7 |
| Clay-Colored Sparrow | 15181 | 13719 | -1462 | -9.6 |
| Field Sparrow | 15181 | 13719 | -1462 | -9.6 |
| Milk Snake | 33041 | 30076 | -2965 | -9.0 |
| Willow Flycatcher | 31008 | 28268 | -2740 | -8.8 |
| Song Sparrow | 31008 | 28268 | -2740 | -8.8 |
| Common Redpoll | 31008 | 28268 | -2740 | -8.8 |
| American Tree Sparrow | 32518 | 29678 | -2840 | -8.7 |
| Black-Billed Cuckoo | 19294 | 17810 | -1484 | -7.7 |
| Northern Bobwhite | 19294 | 17810 | -1484 | -7.7 |
| House Wren | 19294 | 17810 | -1484 | -7.7 |
| Green-Winged Teal | 20804 | 19220 | -1584 | -7.6 |
| Northern Harrier | 20887 | 19338 | -1549 | -7.4 |
| Swamp Sparrow | 22397 | 20748 | -1649 | -7.4 |
| American Bittern | 22397 | 20748 | -1649 | -7.4 |
| Alder Flycatcher | 18854 | 17530 | -1324 | -7.0 |
| Eastern Kingbird | 18854 | 17530 | -1324 | -7.0 |
| Wood Turtle | 18854 | 17530 | -1324 | -7.0 |
| Common Yellowthroat | 20364 | 18940 | -1424 | -7.0 |
| Least Bittern | 20364 | 18940 | -1424 | -7.0 |
| Woodchuck | 13022 | 12131 | -891 | -6.8 |
| Northern Shoveler | 1510 | 1410 | -100 | -6.6 |
| Marsh Wren | 1510 | 1410 | -100 | -6.6 |
| Northern Pintail | 1510 | 1410 | -100 | -6.6 |
| Rough-Legged Hawk | 1510 | 1410 | -100 | -6.6 |
| Common Grackle | 23079 | 21588 | -1491 | -6.5 |
| Common Snipe | 23079 | 21588 | -1491 | -6.5 |
| Rusty Blackbird | 19536 | 18370 | -1166 | -6.0 |
| Common Nighthawk | 3467 | 3261 | -206 | -5.9 |
| White-Throated Sparrow | 84448 | 80117 | -4331 | -5.1 |
| Red-Breasted Nuthatch | 61955 | 59077 | -2878 | -4.7 |
| Boreal Chickadee | 64895 | 61885 | -3010 | -4.6 |
| Mallard | 35119 | 33559 | -1560 | -4.4 |
| Brewer's Blackbird | 4225 | 4058 | -167 | -4.0 |
| Yellow Warbler | 22668 | 21809 | -859 | -3.8 |
| Black-Crowned Night-Heron | 23738 | 22939 | -799 | -3.4 |
| Connecticut Warbler | 2715 | 2648 | -67 | -2.5 |
| Wilson's Warbler | 2715 | 2648 | -67 | -2.5 |
| Palm Warbler | 2715 | 2648 | -67 | -2.5 |
| Tennessee Warbler | 2715 | 2648 | -67 | -2.5 |
| Fisher | 83705 | 82000 | -1705 | -2.0 |
| Lincoln's Sparrow | 5742 | 5629 | -1703 | -2.0 -2.0 |
| Kirtland's Warbler | 3027 | 2981 | -46 | -1.5 |
| Merlin | 87684 | 86669 | -1015 | -1.3 -1.2 |
| Big Brown Bat | 14755 | 14619 | -136 | -0.9 |
| _ | | | | |
| Gray Jay | 67791 | 67278 | -513 | -0.8 |

| Common Garter Snake | 232966 | 231317 | -1649 | -0.7 |
|--------------------------------|--------|--------|-------|------|
| Ruby-Crowned Kinglet | 67651 | 67194 | -457 | -0.7 |
| Pine Siskin | 67963 | 67527 | -436 | -0.6 |
| Mink | 22965 | 22821 | -144 | -0.6 |
| King Rail | 22965 | 22821 | -144 | -0.6 |
| Red-Winged Blackbird | 22965 | 22821 | -144 | -0.6 |
| Blanding's Turtle | 22965 | 22821 | -144 | -0.6 |
| Winter Wren | 64851 | 64470 | -381 | -0.6 |
| Black-Backed Woodpecker | 70765 | 70348 | -417 | -0.6 |
| Spring Peeper | 134559 | 133772 | -787 | -0.6 |
| Wood Frog | 134559 | 133772 | -787 | -0.6 |
| Gray Treefrog | 134559 | 133772 | -787 | -0.6 |
| Tree Swallow | 15825 | 15749 | -76 | -0.5 |
| Canada Goose | 15825 | 15749 | -76 | -0.5 |
| Barn Swallow | 15825 | 15749 | -76 | -0.5 |
| American Marten | 68560 | 68291 | -269 | -0.4 |
| Striped Skunk | 207195 | 206570 | -625 | -0.3 |
| Brown-Headed Cowbird | 207195 | 206570 | -625 | -0.3 |
| Eastern Cottontail | 207195 | 206570 | -625 | -0.3 |
| Northern Flicker | 207195 | 206570 | -625 | -0.3 |
| American Crow | 207195 | 206570 | -625 | -0.3 |
| Least Chipmunk | 62400 | 62227 | -173 | -0.3 |
| Red-Breasted Merganser | 21455 | 21411 | -44 | -0.2 |
| American Toad | 212079 | 211979 | -100 | -0.1 |
| Western Meadowlark | 0 | 0 | 0 | 0.0 |
| Upland Sandpiper | 0 | 0 | 0 | 0.0 |
| Dickcissel | 0 | 0 | 0 | 0.0 |
| Bobolink | 0 | 0 | 0 | 0.0 |
| House Finch | 0 | 0 | 0 | 0.0 |
| Savannah Sparrow | 0 | 0 | 0 | 0.0 |
| Chimney Swift | 0 | 0 | 0 | 0.0 |
| Evening Grosbeak | 0 | 0 | 0 | 0.0 |
| Grasshopper Sparrow | 0 | 0 | 0 | 0.0 |
| Western Kingbird | 0 | 0 | 0 | 0.0 |
| Ring-necked Pheasant | 0 | 0 | 0 | 0.0 |
| Horned Lark | 0 | 0 | 0 | 0.0 |
| Eastern Meadowlark | 0 | 0 | 0 | 0.0 |
| Vesper Sparrow | 0 | 0 | 0 | 0.0 |
| American Badger | 0 | 0 | 0 | 0.0 |
| Thirteen-Lined Ground Squirrel | 0 | 0 | 0 | 0.0 |
| Great Horned Owl | 210569 | 210569 | 0 | 0.0 |
| American Kestrel | 0 | 0 | 0 | 0.0 |
| Snowy Owl | 0 | 0 | 0 | 0.0 |
| Snow Bunting | 0 | 0 | 0 | 0.0 |
| Le Conte's Sparrow | 0 | 0 | 0 | 0.0 |
| Henslow's Sparrow | 0 | 0 | 0 | 0.0 |
| Sedge Wren | 0 | 0 | 0 | 0.0 |
| Northern Flying Squirrel | 105570 | 105866 | 296 | 0.3 |
| White-Footed Mouse | 195481 | 196112 | 631 | 0.3 |

| Northern Goshawk | 195041 | 195832 | 791 | 0.4 |
|-----------------------------|--------|--------|------|-----|
| Sharp-Shinned Hawk | 195041 | 195832 | 791 | 0.4 |
| Woodland Jumping Mouse | 174679 | 175578 | 899 | 0.5 |
| Long-Eared Owl | 91751 | 92233 | 482 | 0.5 |
| Four-Toed Salamander | 45798 | 46114 | 316 | 0.7 |
| Black-Throated Blue Warbler | 43083 | 43466 | 383 | 0.9 |
| Spotted Salamander | 43083 | 43466 | 383 | 0.9 |
| Canada Warbler | 43083 | 43466 | 383 | 0.9 |
| Ringneck Snake | 43083 | 43466 | 383 | 0.9 |
| American Woodcock | 198039 | 199876 | 1837 | 0.9 |
| Common Raccoon | 276420 | 279408 | 2988 | 1.1 |
| Moose | 224646 | 227282 | 2636 | 1.2 |
| Virginia Opossum | 201413 | 203875 | 2462 | 1.2 |
| Purple Finch | 63630 | 64542 | 912 | 1.4 |
| Coyote | 284165 | 288298 | 4133 | 1.5 |
| Common Raven | 284165 | 288298 | 4133 | 1.5 |
| Yellow-Billed Cuckoo | 186325 | 189418 | 3093 | 1.7 |
| Pygmy Shrew | 264004 | 268501 | 4497 | 1.7 |
| Ruffed Grouse | 185885 | 189138 | 3253 | 1.8 |
| Broad-Winged Hawk | 179185 | 182346 | 3161 | 1.8 |
| Whip-Poor-Will | 179185 | 182346 | 3161 | 1.8 |
| Bobcat | 266190 | 270944 | 4754 | 1.8 |
| Wood Duck | 26339 | 26820 | 481 | 1.8 |
| Green Heron | 26339 | 26820 | 481 | 1.8 |
| Snowshoe Hare | 222566 | 226721 | 4155 | 1.9 |
| Brown Snake | 266139 | 271338 | 5199 | 2.0 |
| Gray Catbird | 189699 | 193417 | 3718 | 2.0 |
| American Redstart | 189699 | 193417 | 3718 | 2.0 |
| Southern Red-Backed Vole | 272451 | 277840 | 5389 | 2.0 |
| Tiger Salamander | 184069 | 187755 | 3686 | 2.0 |
| Mourning Warbler | 269736 | 275192 | 5456 | 2.0 |
| Masked Shrew | 272011 | 277560 | 5549 | 2.0 |
| Southern Bog Lemming | 241575 | 246515 | 4940 | 2.0 |
| American Robin | 182559 | 186345 | 3786 | 2.1 |
| Red-Headed Woodpecker | 43951 | 44859 | 908 | 2.1 |
| Cooper's Hawk | 182559 | 186345 | 3786 | 2.1 |
| Eastern Red Bat | 182559 | 186345 | 3786 | 2.1 |
| Cedar Waxwing | 182559 | 186345 | 3786 | 2.1 |
| Long-Tailed Weasel | 270418 | 276032 | 5614 | 2.1 |
| Golden-Crowned Kinglet | 79865 | 81526 | 1661 | 2.1 |
| Ermine | 270418 | 276032 | 5614 | 2.1 |
| Hoary Bat | 262596 | 268120 | 5524 | 2.1 |
| Black Bear | 262596 | 268120 | 5524 | 2.1 |
| Red Fox | 262596 | 268120 | 5524 | 2.1 |
| Northern Short-Tailed Shrew | 262596 | 268120 | 5524 | 2.1 |
| Great Gray Owl | 70018 | 71496 | 1478 | 2.1 |
| Northern Cardinal | 187700 | 191662 | 3962 | 2.1 |
| Nashville Warbler | 269978 | 275752 | 5774 | 2.1 |
| Deer Mouse | 263278 | 268960 | 5682 | 2.2 |

| North and Carry What Ord | 00007 | 04775 | 4700 | 0.0 |
|---|------------------|-----------------|--------------|------------|
| Northern Saw-Whet Owl Eastern Phoebe | 80037 | 81775 47465 | 1738 1008 | 2.2 2.2 |
| | 46457 | | | |
| Blue-Spotted Salamander American Beaver | 46457 | 47465 149915 | 1008 3381 | 2.2 2.3 |
| | 146534 | | | |
| Northern Myotis | 265197 | 272001 | 6804 | 2.6 |
| Little Brown Myotis | 265197 | 272001 | 6804 | 2.6 |
| Brown Thrasher | 167471 | 171888 | 4417 | 2.6 |
| Red-Tailed Hawk | 170058 | 174589 | 4531 | 2.7 |
| Ruby-Throated Hummingbird | 101497 | 104221 | 2724 | 2.7 |
| Chipping Sparrow | 147628 | 151653 | 4025 | 2.7 |
| Yellow-Bellied Sapsucker | 167031 | 171608 | 4577 | 2.7 |
| Ovenbird | 167031 | 171608 | 4577 | 2.7 |
| Least Flycatcher | 167031 | 171608 | 4577 | 2.7 |
| Brown Creeper | 250442 | 257382 | 6940 | 2.8 |
| Black-Capped Chickadee | 250442 | 257382 | 6940 | 2.8 |
| Great Crested Flycatcher | 44458 | 45710 | 1252 | 2.8 |
| Acadian Flycatcher | 44458 | 45710 | 1252 | 2.8 |
| Red-Bellied Woodpecker | 44458 | 45710 | 1252 | 2.8 |
| Red Squirrel | 189076 | 194508 | 5432 | 2.9 |
| Eastern Box Turtle | 173417 | 178470 | 5053 | 2.9 |
| Warbling Vireo | 170845 | 175887 | 5042 | 3.0 |
| Indigo Bunting | 170845 | 175887 | 5042 | 3.0 |
| Downy Woodpecker | 170405 | 175607 | 5202 | 3.1 |
| Eastern Newt | 254553 | 262673 | 8120 | 3.2 |
| Tufted Titmouse | 168406 | 173852 | 5446 | 3.2 |
| Common Porcupine | 234869 | 242814 | 7945 | 3.4 |
| Common Gray Fox | 174792 | 180714 | 5922 | 3.4 |
| Blue Jay | 182045 | 188664 | 6619 | 3.6 |
| Black-And-White Warbler | 209917 | 217626 | 7709 | 3.7 |
| Cerulean Warbler | 160395 | 166339 | 5944 | 3.7 |
| Five-Lined Skink | 160395 | 166339 | 5944 | 3.7 |
| Wild Turkey | 129894 | 134724 | 4830 | 3.7 |
| Gray Wolf | 252678 | 262219 | 9541 | 3.8 |
| Chestnut-Sided Warbler | 213731 | 221905 | 8174 | 3.8 |
| Eastern Chipmunk | 161703 | 168012 | 6309 | 3.9 |
| Hairy Woodpecker | 213291 | 221625 | 8334 | 3.9 |
| Eastern Gray Squirrel | 161263 | 167732 | 6469 | 4.0 |
| Eastern Wood-Pewee | 161263 | 167732 | 6469 | 4.0 |
| Scarlet Tanager | 161263 | 167732 | 6469 | 4.0 |
| Eastern Fox Squirrel | 161263 | 167732 | 6469 | 4.0 |
| Red-Shouldered Hawk | 163769 | 170338 | 6569 | 4.0 |
| Southern Flying Squirrel | 161263 | 167732 | 6469 | 4.0 |
| Rose-Breasted Grosbeak | 161263 | 167732 | 6469 | 4.0 |
| | 163769 | 170338 | 6569 | 4.0 |
| Veery | | | | |
| Red-Eyed Vireo | 161263 | 167732 | 6469 | 4.0 |
| White-Breasted Nuthatch | 161263 161770 | 167732 | 6469 | 4.0 |
| Pileated Woodpecker | 161770 | 168583 | 6813 | 4.2 |
| White-Tailed Deer | 229224 | 239053 | 9829 | 4.3 |
| Philadelphia Vireo | 119751 | 124908 | 5157 | 4.3 |

| Redbelly Snake | 147468 | 154041 | 6573 | 4.5 |
|---------------------------|--------|--------|-------|------|
| Blue-Gray Gnatcatcher | 162638 | 169976 | 7338 | 4.5 |
| Wood Thrush | 162638 | 169976 | 7338 | 4.5 |
| Baltimore Oriole | 162638 | 169976 | 7338 | 4.5 |
| Barred Owl | 168212 | 176187 | 7975 | 4.7 |
| American Black Duck | 71258 | 74646 | 3388 | 4.8 |
| Silver-Haired Bat | 222432 | 233158 | 10726 | 4.8 |
| Bald Eagle | 227966 | 239754 | 11788 | 5.2 |
| Arctic Shrew | 73596 | 77729 | 4133 | 5.6 |
| Eastern Hognose Snake | 129706 | 137039 | 7333 | 5.7 |
| Yellow-Throated Vireo | 119555 | 126510 | 6955 | 5.8 |
| Northern Waterthrush | 71563 | 75921 | 4358 | 6.1 |
| Star-Nosed Mole | 76970 | 81728 | 4758 | 6.2 |
| Water Shrew | 77707 | 83020 | 5313 | 6.8 |
| Eastern Towhee | 4335 | 4654 | 319 | 7.4 |
| Hooded Merganser | 46260 | 50017 | 3757 | 8.1 |
| Common Goldeneye | 45487 | 49899 | 4412 | 9.7 |
| Bufflehead | 45487 | 49899 | 4412 | 9.7 |
| Osprey | 45487 | 49899 | 4412 | 9.7 |
| Common Merganser | 48861 | 53898 | 5037 | 10.3 |
| Swainson's Thrush | 52027 | 57551 | 5524 | 10.6 |
| Double-Crested Cormorant | 46862 | 52143 | 5281 | 11.3 |
| American Coot | 6144 | 7099 | 955 | 15.5 |
| Northern Water Snake | 6144 | 7099 | 955 | 15.5 |
| Pickerel Frog | 6144 | 7099 | 955 | 15.5 |
| Painted Turtle | 6144 | 7099 | 955 | 15.5 |
| Ring-Necked Duck | 6144 | 7099 | 955 | 15.5 |
| Sora | 6144 | 7099 | 955 | 15.5 |
| Pine Warbler | 11987 | 14075 | 2088 | 17.4 |
| Mink Frog | 4634 | 5689 | 1055 | 22.8 |
| Yellow-Bellied Flycatcher | 682 | 840 | 158 | 23.2 |
| Great Blue Heron | 7485 | 9290 | 1805 | 24.1 |
| Muskrat | 4111 | 5291 | 1180 | 28.7 |
| Black Tern | 4111 | 5291 | 1180 | 28.7 |
| Gadwall | 4111 | 5291 | 1180 | 28.7 |
| Virginia Rail | 4111 | 5291 | 1180 | 28.7 |
| Pied-Billed Grebe | 4111 | 5291 | 1180 | 28.7 |
| Horned Grebe | 4111 | 5291 | 1180 | 28.7 |
| Green Frog | 4111 | 5291 | 1180 | 28.7 |
| Peregrine Falcon | 4111 | 5291 | 1180 | 28.7 |
| Yellow-Headed Blackbird | 4111 | 5291 | 1180 | 28.7 |
| Ruddy Duck | 4111 | 5291 | 1180 | 28.7 |
| Northern Leopard Frog | 4111 | 5291 | 1180 | 28.7 |
| Redhead | 4111 | 5291 | 1180 | 28.7 |
| American Wigeon | 4111 | 5291 | 1180 | 28.7 |
| Bullfrog | 4111 | 5291 | 1180 | 28.7 |
| Snapping Turtle | 4111 | 5291 | 1180 | 28.7 |
| Bank Swallow | 2601 | 3881 | 1280 | 49.2 |
| Common Loon | 2601 | 3881 | 1280 | 49.2 |

| Common Map Turtle | 2601 | 3881 | 1280 | 49.2 |
|-------------------------------|------|------|------|------|
| Cliff Swallow | 2601 | 3881 | 1280 | 49.2 |
| Herring Gull | 2601 | 3881 | 1280 | 49.2 |
| Northern River Otter | 2601 | 3881 | 1280 | 49.2 |
| Northern Rough-Winged Swallow | 2601 | 3881 | 1280 | 49.2 |
| Killdeer | 2601 | 3881 | 1280 | 49.2 |
| Ring-Billed Gull | 2601 | 3881 | 1280 | 49.2 |
| Oldsquaw | 2601 | 3881 | 1280 | 49.2 |
| Purple Martin | 2601 | 3881 | 1280 | 49.2 |
| Common Tern | 2601 | 3881 | 1280 | 49.2 |
| Belted Kingfisher | 2601 | 3881 | 1280 | 49.2 |
| Piping Plover | 2601 | 3881 | 1280 | 49.2 |
| Caspian Tern | 2601 | 3881 | 1280 | 49.2 |
| Mudpuppy | 2601 | 3881 | 1280 | 49.2 |
| Spotted Sandpiper | 2601 | 3881 | 1280 | 49.2 |